The Winter Prey of *Oliva sayana*

(Gastropoda : Olividae)

BY

NICK FOTHERINGHAM

Department of Biology, University of Houston, Houston, Texas 77004

INTRODUCTION

THE PREDACIOUS MARINE gastropod *Oliva sayana* Ravenel, 1834 has been identified as a predator of the bean clam *Donax* sp. in the field (OLSSON & CROVO, 1968). However, Texas populations of *Donax* migrate into the sublittoral zone during the winter (LOESCH, 1957), at which time I have found large numbers of *Oliva* in the intertidal zone. This suggests that *Oliva* either reduces (or ceases) its feeding activity or depends upon alternate sources of prey during the winter. The purpose of this study is to examine *Oliva*'s responses to a variety of potential alternate prey in the laboratory.

METHODS

All of the organisms tested were collected from habitats occupied by *Oliva* along the exposed beach and passes adjacent to Galveston Island, Texas. Over 100 *Oliva* were collected from the exposed beach in November, 1974, and were maintained in the laboratory on a diet of raw shrimp. The amount of food provided was sufficient to maintain healthy animals without satiating them, as indicated by their behavioral response to additional food.

Most laboratory experiments were conducted in 1.6*l* capacity finger bowls containing a 4cm deep layer of washed beach sand and filled with filtered seawater. Experiments involving large *Polinices duplicatus* were conducted in similarly equipped aquaria of 26*l* capacity. Each experiment lasted 48 hours and involved 1 - 3 prey individuals and 1 - 5 *Oliva*. The water temperature was 25° C, and the salinity was 28 - 31‰.

The mollusks were identified from the descriptions of ANDREWS (1971), the decapod crustaceans were identified from the descriptions of WILLIAMS (1965), and the polychaete was kindly identified by J. B. Wills.

RESULTS AND DISCUSSION

The results of the feeding experiment are shown in Table 1. Each of these experiments involved a single potential prey individual maintained with 5 *Oliva* for 48 hours, except those involving *Onuphis*, in which 3 *Onuphis* were maintained with one *Oliva*. One of the *Emerita* and 5 of the *Pagurus* tested had molted within 24 hours of the start of the test; none of these were consumed.

Table 1

Results of feeding experiments with *Oliva sayana*

Potential prey	Number of experiments	Number of prey consumed
POLYCHAETA		
Onuphis eremita oculata Hartman, 1951	9	0
GASTROPODA		
Polinices duplicatus Say, 1822 (small)	7	7
Polinices duplicatus Say, 1822 (large)	4	0
DECAPOD CRUSTACEA		
Emerita portoricensis Schmitt, 1935	11	2
Lepidopa websteri Benedict, 1903	4	3
Arenaeus cribrarius (Lamarck, 1818)	6	0
Pagurus longicarpus Say, 1817	9	0
Isocheles wurdemanni Stimpson, 1862	3	0

In addition to the live animals shown in Table 1, *Oliva* also readily consumed dead *Isocheles* (in shells), dead *Clibanarius vittatus* (Bosc, 1802) (without shells) and dead large *Polinices*. The *Arenaeus* tested were all small (carapace width = 15 - 17mm). The small *Polinices* had shell widths of 7.4 - 16.8mm, and the large *Polinices* had shell widths of 26.5 - 34.4mm. The *Lepidopa* and *Emerita* tested were medium-sized (1 - 2cm long).

The species tested in these experiments represent most of the common macroinvertebrates, other than *Donax*, which share the exposed beach habitat with *Oliva* in Texas. Two other prey species of *Oliva* identified by OLSSON & CROVO (1968), *Nassarius* and *Laevicardium*, were not found alive on the exposed beach during this study. Small *Polinices* and *Lepidopa* were the prey most frequently consumed by *Oliva* (Table 1). *Polinices* in this

size range were collected in August but have not been found in winter. Thus, *Polinices* does not seem to be a suitable alternate prey for *Oliva* in winter.

Lepidopa was consumed more frequently than *Emerita*. This is probably partially due to the more sluggish behavior of *Lepidopa*. *Emerita* exhibited an escape response by leaving the sand and swimming a short distance when disturbed. *Lepidopa* was more reluctant to unbury itself when encountered, making it relatively easy prey for *Oliva*. However, *Lepidopa* was much less abundant than *Emerita* during this study.

Onuphis was the most common macroinvertebrate found intertidally with *Oliva* during the winter, yet none of the 27 individuals tested was consumed. In general, none of the species tested seems to represent a significant winter food source for *Oliva*. Thus *Oliva* probably reduces its feeding activity or depends upon dead food during the winter, when *Donax* is not available intertidally.

SUMMARY

The feeding responses of *Oliva sayana* to 7 macroinvertebrate species which represent potential alternate prey during the winter, when its usual prey (*Donax*) is not available, were tested. Only small *Polinices duplicatus* and *Lepidopa websteri* were frequently consumed. However, these two species do not seem sufficiently abundant during the winter to supply *Oliva* with a significant amount of food. Thus the hypothesis that *Oliva* switches to alternate prey during the winter is not supported by these data, and it seems more reasonable that *Oliva* depends upon scavenging or upon a reduced rate of consumption to survive the winter months.

Literature Cited

Andrews, Jean
1971. Sea shells of the Texas coast. Univ. Texas Press, Austin & London: xi - xvii + 3 - 298; illust.; 6 maps

Loesch, Harold C.
1957. Studies of the ecology of two species of *Donax* on Mustang Island, Texas. Bull. Inst. Mar. Sci. 2 (2): 201 - 227 (July 1957)

Olsson, Axel Adolf & L. E. Crovo
1968. Observations on aquarium specimens of *Oliva sayana* Ravenel. The Veliger 11 (1): 31 - 32; plt. 2 (1 July 1968)

Williams, Austin B.
1965. Marine decapod crustaceans of the Carolinas. U. S. Fish & Wildl. Serv., Fishery Bull. 65 (1): i - xi + 298 pp.